

**COMMONWEALTH OF VIRGINIA  
Department of Environmental Quality  
Northern Virginia Regional Office**

**STATEMENT OF LEGAL AND FACTUAL BASIS**

Tuscarora Incorporated  
Sterling, Loudoun County , Virginia  
Permit No. NVRO71814

Title V of the 1990 Clean Air Act Amendments required each state to develop a permit program to ensure that certain facilities have federal Air Pollution Operating Permits, called Title V Operating Permits. As required by 40 CFR Part 70 and 9 VAC 5 Chapter 80, Tuscarora Incorporated has applied for a Title V Operating Permit for its custom shaped, molded foam products facility. The Department has reviewed the application and has prepared a draft Title V Operating Permit.

Engineer/Permit Contact:\_\_\_\_\_ Date:

Air Permit Manager:\_\_\_\_\_ Date:

## **FACILITY INFORMATION**

### Permittee

Tuscarora Incorporated  
800 Fifth Avenue  
New Brighton, PA 15066

### Facility

Tuscarora Incorporated  
45037 Moran Road  
Sterling, Virginia 20166

AIRS ID No. 51-107-0073

## **SOURCE DESCRIPTION:** SIC Code 3086 – Plastic Foam Products.

Tuscarora Incorporated is a custom-shape molder of expandable polystyrene (EPS) and other polystyrene-based polymers, polystyrene/polyethylene copolymers, and other expandable polymeric resin materials. The facility manufactures products for packaging, materials handling, and structural components. The polymeric resins are received in bead form, then expanded and fused into molded product through a series of production steps. Pressurized steam is applied to the beads in the pre-expansion process. After pre-expansion, the partially expanded beads are pneumatically transferred for temporary storage before being molded into final form. Finished goods can be stored on-site prior to shipment. Volatile organic compound (VOC) emissions result from evaporation during production and storage operations.

The facility is a Title V major source of VOC. This source is located in an area that is classified as a severe nonattainment area for ozone, and attainment for all remaining criteria pollutants. The facility is a major source for the nonattainment new source review program, and is a PSD minor source. The facility is permitted under two minor new source review permits, and one Consent Agreement implementing Reasonably Available Control Technology (RACT) requirements. The minor NSR permit issued September 03, 1997, and superseded on March 7, 2003 governs the operation of the expandable polystyrene production expansion and molding operations. The minor NSR permit issued August 31, 2001, governs the operation of a 14.65 MMBtu/hr boiler fired with natural gas and distillate oil. The June 29, 1996, Consent Agreement implementing RACT for the then existing production equipment was approved by the U.S. EPA in the Federal Register on January 22, 1999.

## **COMPLIANCE STATUS**

The facility is inspected once a year. It was last inspected on February 6, 2003, and determined to be in compliance.

## EMISSION UNIT AND CONTROL DEVICE IDENTIFICATION

The emissions units at this facility consist of the following :

Emission Unit ID	Stack ID	Emission Unit Description	Size/Rated Capacity*	Pollution Control Device (PCD) Description	PCD ID	Pollutant Controlled	Applicable Permit Date
<b>Fuel Burning Equipment</b>							
001	S2	Cleaver Brooks, Model CB600-250, natural gas/distillate oil fired boiler (Pre NSPS)	10.46 x 10 <sup>6</sup> Btu/hr (heat input)	---	---	---	---
002	S3	Cleaver Brooks, Model CB200-350, natural gas/distillate oil fired boiler (NSPS)	14.65 x 10 <sup>6</sup> Btu/hr (heat input)	---	---	---	---
<b>Process A</b>							
003	S1, DV1-11 EF1- EF6**	EPS/ARCEL Production	2000 lbs./hr	---	---	---	---

\* The Size/Rated capacity is provided for informational purposes only, and is not an applicable requirement.

\*\* The production operations associated with Emission Unit ID 003 are released to the atmosphere through general exhaust fans (designated as EF), with the exception of one pre-expander which exhausts through Stack ID S1.

## EMISSIONS INVENTORY

A copy of the 2002 annual emission update is attached as **Attachment A**. Emissions are summarized in the following table. Hazardous air pollutant emissions from this facility are considered negligible.

**Table 1. 2002 Actual Emissions – Tuscarora Incorporated, Sterling, VA**

Criteria Pollutant Emission in Tons/Year				
VOC	CO	SO <sub>2</sub>	PM <sub>10</sub>	NO <sub>x</sub>
70.56	3.16	0.08	0.23	2.17

## EMISSION UNIT APPLICABLE REQUIREMENTS – (Emission Units 001 and 002)

### Limitations – Emissions Unit 001

Particulate, sulfur dioxide (SO<sub>2</sub>), and visible emissions standards are established in the Virginia Administrative Code in 9 VAC 5 Chapter 40, Part II, Article 8 *Emission Standards for Fuel Burning Equipment* for the natural gas/distillate oil-fired 250 horsepower (hp) Boiler 001. The following Virginia Administrative Code requirements have been determined to be applicable:

- 9 VAC 5-40-900 A 2, Existing source standard for particulate matter;
- 9 VAC 5-40-930 A 2, Existing source standard for sulfur dioxide;
- 9 VAC 5-40-940, Existing source standard for visible emissions.

Table 3 identifies the allowable particulate and SO<sub>2</sub> standards, the maximum predicted emissions, and the margin of compliance for the boiler. Documentation supporting the derivation of the allowable particulate and SO<sub>2</sub> emissions, and calculations of maximum predicted emissions are contained in **Attachment E**.

**Table 2. Summary of Particulate and SO<sub>2</sub> Emission Standards for Emission Unit 001 at Tuscarora Incorporated, Sterling, Virginia**

ITEM	Boiler 001
<b><i>Particulate Emissions Standard</i></b>	
Allowable Particulate Emissions <sup>1</sup> - lbs./MMBtu	0.3
Max. Predicted Particulate Emissions - lbs./MMBtu	0.017
Margin of Compliance <sup>2</sup>	94.3%
<b><i>Sulfur Dioxide Emissions Standard</i></b>	
Allowable SO <sub>2</sub> Emissions <sup>3</sup> – lbs./hr	11.1
Max. Predicted SO <sub>2</sub> Emissions – lbs./hr	5.3
Margin of Compliance	52.3%

<sup>1</sup> Particulate emissions standards are established in 9 VAC 5-40-900 A 2.

<sup>2</sup> Margin of compliance is calculated as: [(limit - max. predicted) / limit] x 100

<sup>3</sup> SO<sub>2</sub> emissions standards are established in 9 VAC 5-40-930 A 2.

### Monitoring and Recordkeeping – Emission Unit 001

Since Boiler 001 does not have add-on air pollution control equipment, the overall compliance strategy entails proper operation and maintenance to achieve compliance with applicable requirements. The proposed permit requires the permittee to operate and maintain Boiler 001 in a manner consistent with good air pollution control practices for minimizing emissions.

The allowable particulate emissions for the boiler are 0.3 lbs./MMBtu. The maximum predicted particulate emissions are 0.017 lbs./MMBtu while firing the worst-case fuel type (distillate oil) and based upon the AP-42 emission factor with a 20 percent safety factor included in the calculation. Since the maximum predicted particulate emissions indicate a 94% margin of compliance with the worst-case fuel, proper operation and maintenance of the boiler will assure that compliance with particulate limit is achieved. The permit requires the permittee to operate and maintain the boiler in accordance with good air pollution control practices for minimizing emissions, and maintain records of boiler maintenance.

The large margin of compliance for the particulate emissions standard also serves as an indicator for compliance with the opacity emission standards. It is highly unlikely that the opacity standards will be exceeded during normal operations given the large margin of compliance with the particulate standards and the firing of the boiler with natural gas as a primary fuel, and distillate oil as a backup fuel. The requirement to operate and maintain the boiler in a manner consistent with air pollution control practices for limiting emissions establishes proper operation and maintenance as a federally enforceable requirement and provides a reasonable assurance of compliance with the opacity emission standard.

The allowable SO<sub>2</sub> emissions for the boiler are 11.1 lbs./hr. The maximum predicted SO<sub>2</sub> emissions are 5.3 lbs./hr based on a total conversion of the fuel sulfur to SO<sub>2</sub> firing the worst-case fuel of distillate oil. The permit restricts the allowable fuel types to distillate oil and natural gas. The maximum fuel sulfur content of the distillate oil is defined by the American Society of Testing and Materials (ASTM) method, which establishes specifications for fuel oil. The permit limits the fuel type to that meeting the specifications of No. 1 or No. 2 fuel oils in accordance with ASTM Method D396-78 "Standard Specification for Fuel Oils." This method specifically limits the fuel sulfur content of No. 1 and No. 2 fuel oils to a maximum of 0.5 percent.

Since the maximum predicted SO<sub>2</sub> emissions indicate a 52% margin of compliance with the worst-case fuel, the periodic monitoring for demonstrating compliance with the SO<sub>2</sub> emission standard requires the permittee to obtain fuel supplier certifications with each shipment of distillate oil delivered. The certifications must contain information to document that the oil complies with the ASTM specifications for fuel oils no. 1 and 2. While firing natural gas, compliance with the established limit for SO<sub>2</sub> can be assured from proper operation of the boiler.

Therefore, conformance with the ASTM specifications for fuel oil, and maintaining proper operation and maintenance of the boiler at all times provides a reasonable assurance of compliance with the SO<sub>2</sub> emission standards.

### **Limitations – Emission Unit 002**

The following limitations are state BACT requirements from the Minor NSR Permit issued on December 23, 1997, and superceded on August 28, 2001, for the natural gas/distillate oil-fired 350 hp Boiler 002. A copy of the permit is attached as **Attachment B**.

- Condition 1 establishing the approved fuel types of natural gas and distillate oil;
- Condition 4 establishing NO<sub>x</sub> emission limits and requiring low NO<sub>x</sub> burner technology;
- Condition 8 establishing visible emission limits;
- Condition 9 establishing emission limits for TSP, PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>x</sub>, CO, and VOC emissions;

- Condition 10 establishing control of PM, PM-10, CO, VOC, and SO<sub>2</sub> emissions by only allowing combustion of clean burning fuels, and proper operation and maintenance of the boiler and the boiler components;
- Condition 11 requiring proper operation and maintenance and boiler operator training.

Additionally, Boiler 002 is subject to the New Source Performance Standard (NSPS) contained in Title 40 of the Code of Federal Regulations, Part 60 (40 CFR 60), Subpart Dc entitled *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units*. This NSPS establishes SO<sub>2</sub> and opacity limitations for the boiler as well as monitoring and recordkeeping provisions. The permit requires the permittee to operate the boiler in compliance with this Federal standard.

### **Monitoring and Recordkeeping**

Boiler 002 is enabled with low NO<sub>x</sub> burner technology to reduce emissions of nitrogen oxides. However, similar to Boiler 001, Boiler 002 does not have add-on air pollution control equipment. Therefore, the overall compliance strategy for the boiler entails proper operation and maintenance to achieve compliance with applicable requirements. Monitoring and recordkeeping provisions are established to ensure that proper operation and maintenance continues to achieve compliance with applicable requirements. The monitoring and recordkeeping requirements in Conditions 9, 13, 14, and 21 of the NSR permit issued to Boiler 002 have been modified to meet Part 70 requirements.

The permit includes requirements for maintaining records of all emission data and operating parameters necessary to demonstrate compliance. These records include: records of operator training on the proper operation of equipment, records on all scheduled and unscheduled maintenance, records of monthly natural gas consumption, and daily and monthly throughput of distillate oil.

The SO<sub>2</sub> limits contained in the operating permit are based on the limits established in the new source permit for the boiler. The SO<sub>2</sub> limits established in the new source permit are based on the allowable sulfur content in the fuel and assumes that all fuel sulfur is emitted as SO<sub>2</sub>. Short-term SO<sub>2</sub> emission limits are based on the maximum heat input rating of the boiler; the annual SO<sub>2</sub> emission limits are based on operation at 8,760 hours using the worst-case fuel, distillate oil. Compliance with emission limits established for SO<sub>2</sub> is demonstrated by complying with the fuel oil sulfur content limit contained in the permit.

The permittee shall obtain a certification from the fuel oil supplier with each shipment of fuel oil delivered. These certifications will include the sulfur content of the oil and a statement that the oil complies with the ASTM specifications for fuel oils no. 1 and no. 2. As long as the fuel oil sulfur content remains at or below 0.5 percent, then compliance with the SO<sub>2</sub> emission limits is assured.

Emission limits for total suspended particulate, PM<sub>10</sub>, NO<sub>x</sub>, CO, and VOC contained in the operating permit are based on the limits established in the new source permit for the boiler. The short-term emission limits for criteria pollutants are based on the boilers operating at maximum capacity. The annual emission limits are based upon operating the boiler at full capacity for 8,760 hours. Both the short term and annual emission limits are based upon the worst-case fuel type for each pollutant. All emission limits established in the minor NSR permit were based on the manufacturer emissions data.

Compliance with the criteria pollutant emission limits is achieved through proper operation and maintenance of the boiler. As long as the boiler is operated and maintained in accordance with manufacturer specifications, the manufacturer supplied emissions data will continue to represent emissions from the unit and there is a reasonable assurance of compliance with the established emission limits. The permittee is required to have a maintenance schedule for the boiler, maintain written operating procedures, and keep records of all maintenance activities.

It is highly unlikely that the opacity standards will be exceeded during normal operations given that the boiler is fired with natural gas as a primary fuel, and distillate oil as a backup fuel. The requirement to operate and maintain the boiler in a manner consistent with air pollution control practices for limiting emissions establishes proper operation and maintenance as a federally enforceable requirement and provides a reasonable assurance of compliance with the opacity emission standard.

Pollutant-specific emission factors will be used to calculate annual emissions on a monthly basis for Boiler 002. The emission factors will be the manufacturer emission factors for the unit. These factors were used to establish permit limits, and provide conservative emission estimates in that the emission factors represent the upper limit of the expected range of emissions. The use of these emission factors provides a reasonable assurance of compliance with emission limitations, and underscores that the operation and maintenance requirements are the controlling parameters limiting emissions. Emissions from the operation of the boiler will be calculated on a monthly basis using the following equation:

$$E_i = EF_i \times TP_{gas,oil}$$

where:

$E_i$	=	Emissions of pollutant i, lbs./time period
$EF_i$	=	Emission factors for pollutant i, (manufacturer factors)
		<u>Natural Gas – lb./mmcf</u> <u>No. 2 Oil – lb/1000 gal</u>
		⊃ 73.5 for NO <sub>x</sub> ⊃ 35 for NO <sub>x</sub>
		⊃ 157.5 for CO      ⊃ 9.8 for CO
		⊃ 1.05 for SO <sub>2</sub> ⊃ 72.1 for SO <sub>2</sub>
		⊃ 16.8 for VOC      ⊃ 3.5 for VOC
		⊃ 10.5 for PM/PM <sub>10</sub> ⊃ 3.36 for PM/PM <sub>10</sub>

\* assumes 1,050 Btu/scf and 140,000 Btu/gal.  
 $TP_{gas,oil}$  = Actual throughput of natural gas or oil, mmcf or 1000 gal

## Testing

The permit does not require source tests. A table of test methods has been included in the permit if testing is performed. The Department and EPA have authority to require testing not included in this permit if necessary to determine compliance with an emission limit or standard.

## Reporting



The August 28, 2001 permit changed the quarterly NSPS fuel reporting frequency to semi-annual reporting requirements.

### **Streamlined Requirements**

The following conditions in the minor NSR permit for Boiler 002 have not been included for the reasons provided:

Condition 13 requiring notification of the date construction commenced, the anticipated start-up date, and the actual start-up date has not been included. The required notifications have been completed rendering the condition obsolete.

Condition 20 establishes that the permit shall become invalid if the unit is not installed within 18 months of the date of the permit. The unit has been installed rendering this condition obsolete.

### **EMISSION UNIT APPLICABLE REQUIREMENTS – (Emission Unit 003)**

#### **Limitations**

Emission Unit 003 encompasses the pre-expansion, pre-puff storage, molding, and finished goods storage of the expandable polystyrene (EPS) beads production line. The following limitations are state BACT requirements from the Minor NSR Permit issued on September 03, 1997, for the Thermoware production operation, and was superseded by the March 7, 2003 NSR permit. A copy of the permit is attached as **Attachment C**.

- Condition 5 establishes that volatile organic compound emissions (VOC) will be controlled by the VOC limits incorporated in the permit, and the Reasonably Available Control Technology (RACT) determination as approved by the U.S. EPA;

#### **Monitoring and Recordkeeping**

Recordkeeping serves to demonstrate compliance with the applicable requirements for the expandable polystyrene production operations. VOC emissions diffuse from the raw material throughout processing, aging, and product storage in a generally unconfined manner. The raw material beads contain pentane, a VOC which serves as an expansion agent. In the pre-expansion process, the beads are subjected to pressurized steam for a given period of time. These conditions cause the beads to soften and the pentane to exert pressure on the beads' cell walls, thereby causing them to expand. VOC emissions result from the evaporation of the pentane from the raw bead material.

The permittee documents the VOC content of the raw material beads from information provided by the bead suppliers. The VOC loss rate during production and storage operations has been documented by the permittee for the beads currently used in production. The permittee must document the VOC loss rate from raw material beads at least once every five-year period, or whenever formulation changes are made to the raw materials (see Facility Wide Conditions). The VOC loss rate information combined with actual production data provides a basis for determining

actual emissions associated with the EPS and Arcel production and storage operations. This material balance VOC calculation methodology documents all VOC releases and provides a means to assess compliance with applicable requirements.

### **Testing**

The permit does not require source tests. A table of test methods has been included in the permit if testing is performed. The Department and EPA have authority to require testing not included in this permit if necessary to determine compliance with an emission limit or standard.

### **Reporting**

Semi-Annual reports are required for demonstrating compliance with all RACT requirements for Emission Unit 003 operations.

### **Streamlined Requirements**

The following condition in the minor NSR permit has not been included for the reasons provided:

Condition 10 establishes that the permit shall become invalid if the production operations are not installed within 18 months of the date of the permit. The Thermoware production equipment has been removed rendering this condition obsolete.

## **FACILITY WIDE CONDITIONS**

### **Limitations**

Facility wide conditions have been incorporated into the proposed operating permit to reflect the VOC RACT determination and to establish a VOC emissions cap for the facility. The RACT determination was implemented through a Consent Agreement signed June 29, 1996. A copy of the RACT Agreement is included as **Attachment D**. This agreement was approved by the U.S. EPA as documented in the January 22, 1999, Federal Register. The agreement established, among other items, a maximum monthly weighted average VOC content of the raw material beads. As stipulated in the September 3, 1997, permit issued for the expandable polystyrene production operations, the RACT determination also applies to the raw material beads used in expandable polystyrene production. Therefore, the RACT determination applies to all molded foam production operations at the facility.

The establishment of a facility wide VOC emissions limit clearly defines the potential to emit for the facility. An emissions cap was requested by the applicant, and the Department agrees that it is reasonable and advantageous to clearly delineate the facility wide VOC limitation.

The following facility wide requirements are based upon the June 29, 1996 Consent Agreement implementing VOC RACT, the September 3, 1997, permit governing the Thermoware and expandable polystyrene production operations, and the December 23, 1997, permit for the natural gas/distillate oil-fired 350 hp Boiler 002.

- VOC emissions to be controlled by use of low and reduced VOC containing beads (Condition 3 under Section E: Agreement of the June 29, 1996 Consent Agreement);
- Monthly weighted average VOC content of expandable polystyrene (EPS) beads not to exceed 4.5 percent (Condition 4 under Section E: Agreement of the June 29, 1996 Consent Agreement);
- Monthly weighted average VOC content of ARCEL beads not to exceed 8.5 percent (Condition 5 under Section E: Agreement of the June 29, 1996 Consent Agreement);
- Annual VOC emissions not to exceed 105 tons per year from the facility with specific process emissions delineated as follows:

Unit ID	Description	VOC Emissions tons/yr.	Basis
001	10.46 MMBtu/hr Boiler	0.3	AP-42*
002	14.65 MMBtu/hr Boiler	1.6	08/28/01 Permit
003	EPS/ARCEL Production	103	06/29/96 Agreement
<b>Facility Total</b>		<b>105</b>	

\* A safety factor of 20 percent has been included in the calculation of maximum emissions to account for variability in the general emission factor.

## Monitoring and Recordkeeping

For the natural gas and distillate oil-fired boilers, Emission Units 001 and 002, operation and maintenance of the boilers in accordance with good air pollution control practices for minimizing emissions, and documentation of this, will serve to assure compliance with the annual emission limits. The discussion of the monitoring and recordkeeping discussed previously for these emission units should be reviewed for additional information.

For the pre-expansion, pre-puff storage, molding, and finished product storage associated with Emission Unit 003, recordkeeping serves to demonstrate compliance with the applicable requirements. As discussed above with the EPS production operations, VOC emissions diffuse from the raw material throughout processing, aging, and product storage in a generally unconfined manner. The raw material beads contain pentane, a VOC that serves as an expansion agent. In the pre-expansion process, the beads are subjected to pressurized steam for a given period of time. These conditions cause the beads to soften and the pentane to exert pressure on the beads' cell walls, thereby causing them to expand. VOC emissions result from the evaporation of the pentane from the raw bead material.

The permittee documents the VOC content of the raw material beads from information provided by the bead suppliers. The VOC loss rate during production and storage operations has been documented by the permittee for the beads currently used in production. The proposed permit requires the permittee to document the VOC loss rate from raw material beads used in production at least once every five year period, or whenever formulation changes are made to the raw materials. The VOC loss rate information combined with actual production data provides a basis for determining actual emissions associated with production and storage operations. This material balance VOC

calculation methodology documents all VOC releases and provides a means to assess compliance with the monthly weighted average limitations and annual emission limits.

### **Testing**

The permit does not require source tests. A table of test methods has been included in the permit if testing is performed. The Department and EPA have authority to require testing not included in this permit if necessary to determine compliance with an emission limit or standard.

### **Reporting**

In addition to the NSPS reporting requirements noted for Emission Unit 002, and the reporting requirements of the General Provisions of the proposed operating permit, the reporting requirements of the RACT Agreement have been incorporated into the proposed operating permit. The permittee is required to submit semi-annual reports demonstrating compliance with all provisions of the RACT Agreement.

### **GENERAL CONDITIONS**

The permit contains general conditions required by 40 CFR Part 70 and 9 VAC 5-80-110, that apply to all Federal operating permit sources. These include requirements for submitting semi-annual monitoring reports and an annual compliance certification report. The permit also requires notification of deviations from permit requirements or any excess emissions, including those caused by upsets, within one business day.

### **FUTURE APPLICABLE REQUIREMENTS**

No future applicable requirements have been identified by the permittee and the Department is not aware of any future applicable requirements which will become effective during the permit term for this facility.

### **INAPPLICABLE REQUIREMENTS**

No inapplicable requirements were identified by the applicant.

### **INSIGNIFICANT EMISSION UNITS**

The insignificant emission units are presumed to be in compliance with all requirements of the Clean Air Act as may apply. Based on this presumption, no monitoring, recordkeeping or reporting shall be required for these emission units in accordance with 9 VAC 5-80-110.

Insignificant emission units include the following:

Emission Unit No.	Emission Unit Description	Citation <sup>1</sup>	Pollutant(s) Emitted (9 VAC 5-80-720 B)	Rated Capacity (9 VAC 5-80-720 C)
005	KBM Regrinder – grinds scrap into foam for re-use	9 VAC 5-80-720 B	Particulate	1000 lbs./day
006	Densifier – densifies scrap foam beads	9 VAC 5-80-720 B	Particulate	120 lbs./hour
007	275-gallon, used oil tank	9 VAC 5-80-720 C	VOC	275 gallons
008	275-gallon, kerosene tank	9 VAC 5-80-720 C	VOC	275 gallons
009	Process water cooling tower	9 VAC 5-80-720 A	VOC	900 gallons/hr
010	Forklifts (4) fired with LP gas	9 VAC 5-80-720 A	NO <sub>x</sub> , CO, Particulate, VOC	---

<sup>1</sup>The citation criteria for insignificant activities are as follows:

9 VAC 5-80-720 A - Listed Insignificant Activity, Not Included in Permit Application

9 VAC 5-80-720 B - Insignificant due to emission levels

9 VAC 5-80-720 C - Insignificant due to size or production rate

## CONFIDENTIAL INFORMATION

The permittee did not submit a request for confidentiality. All portions of the Title V application are suitable for public review.

## PUBLIC PARTICIPATION

The proposed permit will be placed on public notice in the Loudoun Times Mirror from May 21, 2003 to May 21, 2003.

ATTACHMENT A

2002 Annual Emission Statement

ATTACHMENT B

August 31, 2001 Permit  
for  
14.65 MMBtu/hr Natural Gas/Distillate Oil-fired Boiler

ATTACHMENT C

March 7, 2003 Permit  
For  
EPS Production Operation



ATTACHMENT D

June 29, 1996 Consent Agreement

ATTACHMENT E

Calculations Supporting  
Derivation of Emission Standards for Emission Unit 001  
And  
Maximum Emission Calculations

Tuscarora Incorporated  
Permit Number: NVRO71814  
Statement of Basis

## DERIVATION OF BOILER EMISSION STANDARDS

### 1.Determination of Allowable Particulate and Sulfur Dioxide Emissions from Boiler 001.

The 10.46 MMBtu/hr boiler is fired with natural gas or distillate oil. 9 VAC 5-40-900 A 2 establishes a particulate emissions standard in Air Quality Control Region (AQCR) 7 of 0.3 pounds per million Btu input for

SO<sub>2</sub> emissions standards are established in 9 VAC 5-40-280 B. SO<sub>2</sub> standards for combustion installations with liquid or gaseous fuels located in AQCR 7 are established by the following equation:

$$S = 1.06 K$$

where,

S = allowable emission of sulfur dioxide expressed in lbs./hr

K = actual heat input at total capacity expressed in Btu x 10<sup>6</sup> per hour

Solving for the natural-gas fired kiln with a heat input capacity of 10.46 x 10<sup>6</sup> Btu/hr yields:

$$S = 1.06 * 10.46 = 11.1 \text{ lbs/hr}$$

## MAXIMUM EMISSION CALCULATIONS

### 1. Emission Unit 001 – 10.46 MMBtu/hr Cleaver Brooks Boiler

Maximum particulate, SO<sub>2</sub>, and VOC emissions are presented for the worst-case fuel type (either natural gas or distillate oil). The worst-case fuel type for particulate emissions is distillate oil; the worst-case fuel type for VOC emissions is natural gas. Distillate oil is the worst-case fuel type for SO<sub>2</sub> emissions. Calculation of maximum particulate, SO<sub>2</sub>, and VOC emissions are presented below in the appropriate units for the emissions standards listed in the proposed operating permit.

Particulate Emission Factor: 2 lbs/1000 gallons (filterable particulate) as provided in Chapter 1, Section 3, Table 1.3-1, of AP-42, dated 9/98.

Maximum Particulate Emissions Calculation – lbs./MMBtu:

$$E = \frac{2 \text{ lbs}}{1000 \text{ gal Distillate Oil}} \left| \frac{\text{gal Distillate Oil}}{140,000 \text{ Btu}} \right| \left| \frac{10^6 \text{ Btu}}{\text{MMBtu}} \right| \left| \frac{1.2 \text{ Safety Factor}}{1} \right| = 0.017 \text{ lbs/MMBtu}$$

VOC Emission Factor: 5.5 lbs/10<sup>6</sup> ft<sup>3</sup> as provided in Chapter 1, Section 4, Table 1.4-2 of AP-42, dated 3/98.

Maximum VOC Emissions Calculation – tons/yr.:

$$E = \frac{5.5 \text{ lbs}}{10^6 \text{ ft}^3 \text{ gas}} \left| \frac{10.46 \times 10^6 \text{ Btu}}{\text{hr}} \right| \left| \frac{\text{ft}^3 \text{ gas}}{1,000 \text{ Btu}} \right| \left| \frac{8,760 \text{ hrs}}{\text{yr}} \right| \left| \frac{\text{ton}}{2,000 \text{ lbs}} \right| \left| \frac{1.2 \text{ Safety Factor}}{1} \right| = 0.30 \text{ tons/yr}$$

SO<sub>2</sub> Emission Factor: Based on a maximum allowable fuel sulfur content of 0.5 percent in accordance with the ASTM specifications defining No. 2 distillate oil.

Maximum SO<sub>2</sub> Emissions Calculation – lbs./hr:

$$E = \frac{10.46 \times 10^6 \text{ Btu}}{\text{hr}} \left| \frac{\text{gal}}{140,000 \text{ Btu}} \right| \left| \frac{7.05 \text{ lbs}}{\text{gal}} \right| \left| \frac{0.5 \% \text{ Sulfur}}{100} \right| \left| \frac{64.059 \text{ SO}_2}{32.064 \text{ Sulfur}} \right| = 5.3 \text{ lbs/hr}$$